

THE
DESCRIPTION and USE
OF A
NEW MUCH-IMPROVED
SINICAL QUADRANT,

WHEREBY,

A Person knowing Addition and Subtraction only, may learn, in Six Hours, to allow for Variation and Lee-way, &c. Also, determine the Longitude at Sea, and keep a regular Journal of a Voyage to any Part of the World.

This Instrument is equally useful in Altimetry, Surveying, &c. for taking Altitudes, and determining right angled Triangles.

INVENTED BY
JOHN ADAMS, at the Academy,
In Brook-Street, RATCLIFF;

And Made by RICHARD RUST, Mathematical-
Instrument-Maker, St. Catherine's, London.

SKIRVEN, PRINTER, Ratcliff-Highway.

MDCCLXXI.



P R E F A C E.

THE Sinical Quadrant as heretofore made, was much esteemed by former Navigators, nor has it been excelled by any Instrument hitherto published, in accuracy and expedition, for determining the Sides and Angles of Nautical Triangles, particularly the Difference of Longitude.

The Quadrant, the Description of which is the Subject of this little Treatise, is on an entire new Plan, and more extensive in its Use than any Instrument intended for the same Purpose: And it is peculiarly adapted to perform what is expressed in the Title Page. A Person learned by it, in one Hour to work a Traverse (as it is called,) that is, when a Ship has sailed different Distances in different Directions; to find the true Course and Distance she would have sailed in a straight Line; and thence to determine the Place, or Latitude and Longitude the Ship is in. Nor is this Instrument ser-

viceable to the learner only; the most experienced Navigator may by the Assistance of it, work his Days Works in the most expeditious Manner, and determine the Longitude of the Ship, on the Principles of middle Latitude Sailing, more accurately than by the common Tables of Latitude and Departure; of which, (I am sorry I can say it,) there is not one correct Edition extant.

I must here crave Leave of the candid Public, to announce new Tables of Latitude and Departure, which are in the Press, and will be speedily published: Also, new Azimuth and Steering Compasses, ready for publishing, by Mr. Rust.

The above Tables and Instruments, are calculated and divided upon that most excellent Principle of the late Mr. Bird, viz. in the Ratio of 90 to 96, consequently more accurate and commodious than any extant; as the Fractions of the Half and Quarter Points are avoided, and other obvious Advantages gained.

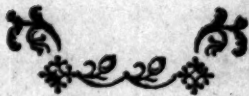
I hope to see this more commodious Division of the Quadrant, universally take place of the Nonagesimal, in all Trigonometrical and Astronomical Instruments.

The

P R E F A C E.

v

The greatest Difficulty will be in translating the Logarithmic Signs, Tangents. &c. It may be truly said *hic labor hoc opus est*, but should the Public say *fiat*, there are Men to be found who will freely undertake the Task, with the Attention of a GARDINER.



The present difficulty will be in maintaining
the present state of things. It
may be said that the law is not perfect, but
it is the best that can be made. There are men to
be found who will not only make the law,
but will also make the law.

T H E
DESCRIPTION and USE
OF A NEW MUCH-IMPROVED
SINICAL QUADRANT.

 **HIS** Instrument consists of Three Parts, a Quadrant, an Index fixed to the Quadrant, and a Tee-square; which make the Instrument complete for the Solution of Nautical Triangles, and for keeping a Journal at Sea. But as this Sinical Quadrant is useful in Altimetry, Surveying, &c. There are Sights and a Plumb-line adapted, (if required,) for taking Altitudes, &c. on Land.

One Side of the Quadrant is inlaid with Box-wood, and divided into 300 equal Parts, which may be called the Difference of Latitude Line; against which, the Top of the Tee-square moves.

The Arc of the Quadrant is also inlaid with Box, and the 90 Degrees are (according to the celebrated Mr. Bird's Method) divided into 96 equal

equal parts and bisected.* The larger Figures, 1, 2, 3, &c. denote the Points of the Compass, and the less Figures, 3, 6, 9, 15, &c. placed at every quarter Point denote the Parts, each of which is equal to $56\frac{1}{2}$ Minutes: This Arc, for Distinction sake, may be called the Rumb Arc.

Within the Rumb Arc is a less concentric Arc, half of which, from 4 to 8 Points, is unequally divided: First from 0 to 30, into Divisions of 5 Parts each, and from 30 to 90, into Divisions of 2 Parts each, which Parts, denote Degrees of Latitude: And this Arc may be called the Latitude Arc.

The Brass Index fixed to the Center of the Quadrant, is divided into 300 equal Parts, in the same Manner as the Latitude Line; and may be called the Distance-sailed Line.

The Tee Square is likewise divided into 300 Parts; and may be called the Departure Line.

* According to this excellent Division, 12 Parts, equal to $11\frac{1}{2}$ deg. make one Point of the Compass; consequently 3 Parts make a quarter of a Point; 6, half a Point; and 9, three quarters of a Point of the Compass; so that the Fractions arising from the common Nonagesimal Division, are entirely obviated: Also, the Points and quarter Points of the Compass agreeing with the Parts, and the Parts agreeing with the Points of the Compass, are easily reckoned by a Learner, without having recourse to a Table for that Purpose, as is the common Method. Thus $3\frac{1}{4}$ Points equal 3 times 12 equal 36 Parts, and the $\frac{1}{4}$ Point is 9 Parts more, or 45 Parts, which Parts may at any Time, immediately, be turned into Degrees and Minutes, by the Table at the end of this Work, should either Curiosity or Logarithmic Calculation require it.

In the Body of the Quadrant there is a Mariner's Compass, with the initial Letters of the different Points; thus, n, n, w, is North-north-west, and s, e, b, e, is South-east by East; and the little Figures round the Compass, from 1 to 8, shew how far the respective Point is from the Meridian, or from the North and South Line.

The Space between each Point is supposed to be divided into Quarters, as it really is in the Mariner's Compass, used on board a Ship. Now, observe, always to read the Quarters from the North and South Points, towards the East and West Points, that is, in the Direction of the Figures 1, 2, 3, &c. As for Example, SSW $\frac{1}{4}$ W that is, South-south-west three quarters towards the West, or $2\frac{1}{4}$ Points; and not, S. W. by S. $\frac{1}{4}$ S. or $3\frac{1}{4}$ Points.

The Figures 10, 20, 30, &c. in the N. and S. Points, signify Degrees of Latitude, and in the E. and W. Points Degrees of Longitude; these are only to elucidate to the Learner, the following Rules.

First, In North Latitude, sailing to the Northward, and in South Latitude, sailing to the Southward, the Latitude increaseth; but in North Latitude sailing to the Southward, and in South Latitude sailing to the Northward the Latitude decreases. Also, in East Longitude, sailing to the Eastward, and in West Longitude, sailing to the Westward, the Longitude increaseth; but in East Longitude sailing to the Westward, and in West Longitude, sailing to the Eastward, the Longitude decreases.

B

Second,

Second, If the Latitudes of two Places be of the same Name, viz. both North, or both South, then subtract the less Latitude from the greater, to find the Difference of Latitude; but if of different Names, the one North, and the other South, then the Sum will be the Difference of Latitude. Also, if the Longitude of two Places be of the same Name, viz. both East, or both West, or of different Names, one East and the other West, the Rule will be the same as to find the Difference of Latitude.

EXAMPLE, I.

What is the Difference of Latitude, and Longitude, between the Lizard Point, and Madeira; the former in Latitude 49d. 55m. N; and Longitude, 4d. 45m. W; and the latter in 32d. 23m. N, and Longitude 17d. 31m. W?

Here the Latitudes and Longitudes are of the same Name, both the Latitudes North, and both the Longitudes West.

49d. 55m. N.	17d. 31m. W.
32d. 23m. N.	4d. 45m. W.
Difference 17d. 32m.	Difference 12d. 46m.
60	60
1052 Miles	or 766 Miles

EXAMPLE, II.

What is the Difference of Lat. and Lon. between the Lizard, and the Cape of good Hope; the former as before, and the latter in Lat. 34d. 25m. S. and 17d. E.

Here

Here the Names are different, N. and S. and E. and W.

49d. 55m. N.	4d. 45m. W.
35d. 15m. S.	17d. E.
Difference 85d. 10m.	Diff. 21d. 45m.
60	60
5110 Miles	1305 Miles

These Examples and the different Lines being known, and a little Attention paid to the Divisions of the Lines, so as to read them off with Ease, the Learner may proceed to the Solution of Nautical Triangles: But, to avoid a needless repetition of Words, I shall denote,

The Diff. of Latitude Line by	Lat. L.
Rumb Arc	Rumb A.
Latitude Arc	Lat. A.
Distance-failed Line	Dist. L.
Departure Line	Dep. L.
Tee Square	T.

EXAMPLE, III.

A Ship fails S.W. by W. 125 Miles, required the Difference of Latitude and Departure.

By looking on the Compass, you may see S.W. by W. $\frac{1}{2}$ W. is $5\frac{1}{2}$ Points from the South towards the West.

Lay the graduated Edge of the Index to 5 Points and two quarters, or 66 Parts, on Rumb A. Then place the Head of the T. against the Lat. L. and slide it up, or down, 'till the graduated Edge

of the T. touches 125, on the graduated Edge of the Index, steady it there, and you will find 59 cut by the T. on the Lat. L. for the Difference of Latitude, and 110½ cut by the Index on the T. for the Departure.

N. B. If the Distance be more than 300, you must take the Half, Quarter, or some Part of it, and you will have the same Part of the Latitude, and Departure. Also, if the Distance be too small, you may double, treble, or quadruple it, and you will have the Double, Treble, or Quadruple of the Latitude and Departure. The same Rule holds good in respect to the other Lines.

EXAMPLE, IV.

A Ship sails S.E. by S. or 3 Points, 348 Miles; what is the Difference of Latitude and Departure?

Lay the Index to 3 Points on the Rumb A. as before: But the Distance being too great for the Instrument, slide the T. 'till it cuts half the Distance, viz. 174, then on the Lat. L. you will have 144½, half the Difference of Latitude, viz. 289 Miles; and on the T. 97, half the Departure, viz. 194 Miles,

EXAMPLE V.

What Course, and Distance, must a Ship sail from the Lizard in Latitude 49d. 55m. N, and Longitude 4d. 45m. W. to Madeira, in Latitude 32d. 23m. N, and Longitude 17d. 31m. W?

The Degrees of Longitude being unequal in different Latitudes, makes this Question require two Operations.

First,

First, find the mean Latitude, viz. add the two Latitudes together, and take half the sum for a mean Latitude, which in this Case is 41 nearly.

Then find the Difference of Latitude and Longitude in Miles between the two Places, by Example 1st. the Difference of Latitude will be 1052, and the Difference of Longitude 766; but the Number being too great for the Instrument; take an equal Part of both, suppose a tenth; then,

A tenth of the Diff. of Lat. is 105, nearly.
A tenth of the Diff. of Long. is 77, nearly.

Now, first, to find the Departure; lay the Index to 41, (the mean Latitude,) on the Lat. A. and slide the T. up or down, 'till 77 upon the T. touches the graduated Edge of the Index, then the T. will cut the Lat. L. in 58, nearly, for the Departure.

Then slide the T. to the Difference of Latitude 105, on the Lat. L. and move the Index 'till it cuts the Departure, 58, on the T. then the Index will cut the Course 32 Parts, or $2\frac{1}{2}$ Points, nearly, on the Rumb A. and the T. will cut 120, on the Index; which is a tenth Part of the Distance, 1200 Miles.

Now, considering that Madeira is in a less northern Latitude than the Lizard, it must lie to the Southward of the Lizard; and being in a greater western Longitude, it must be to the Westward; consequently between the South and West, now looking on the Compass, between the South and West, for $2\frac{1}{2}$ Points, you will find SSW $\frac{1}{2}$ W; which

which Course a Ship must steer, 1200 Miles, to reach Madeira.

EXAMPLE VI.

Being at Sea, in Latitude 40d. 50m. N, and Longitude 15d. 48m. W. What Course, and how far must a Ship sail, to reach Madeira?

The Difference of Latitude between the Place the Ship is in, and Madeira, is 507 Miles; and the Difference of Longitude, is 103 Miles.

The mean Latitude is 37 near enough, lay the Index to 37 on the Lat. A. and slide the T. 'till 103 upon it touches the Index, and it will cut the Lat. L. in 82, for the Departure.

Slide the T. to half the Difference of Latitude, viz. 253½ (the whole being too great for the Instrument) on the Lat. L. and move the Index 'till it cuts half the Departure, viz. 41, on the T. and you will have the Course on the Rumb A. 11 Parts ¾, of a Point, nearly, or S½W; and the T. will cut 256 on the Index, half the Distance, viz. 512 Miles.

EXAMPLE VII.

A Ship sails SW by W, or five Points, 360 Miles from the Lizard, in Latitude 49d. 55m. N, and Longitude 4d. 45m. W. What is her Difference of Latitude, Departure, and the Latitude and Longitude she is in?

First, find the Difference of Latitude, 200 Miles, and the Departure, 299 Miles, by Example 2d.

Turn

Turn the Difference of Latitude, 200 Miles, into Degrees and Minutes, allowing 60 Minutes or Miles to a Degree. The 200 Miles will make 3 Degrees 20 Minutes, which, because the Ship is in N. Latitude, and has sailed to the Southward, must be subtracted from the Latitude sailed from, to find the Latitude in.

Latitude of the Lizard	49d. 55m. N.
Difference of Latitude	3 20

Latitude in	- - -	46 35 N.
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Now, to find the Longitude, take the mean Latitude, between the Latitude sailed from, 49d. 55m. and the Latitude in, 46d. 35m. viz. 48 nearly.

Lay the Index to the mean Latitude, 48, on the Lat. A. slide the T. to half the Departure, 149½, on the Lat. L. and the Index will cut 225 on the T. viz. half the Longitude, 450 Miles, or 7d. 30m. which must be added to the Longitude sailed from, because you are in the West Longitude, and have sailed to the Westward.

Longitude of the Lizard	4d. 45m.
Difference of Longitude	7 30

Longitude in	- - -	12 15
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EXAMPLE VIII.

Suppose a Ship, from Lat. 40d. 10m. N. and Longitude 4d. 12m. W, by variable Winds sailed NNW 40 Miles, SW½W 75 Miles, ENE 35 Miles, E 40 Miles. S 25 Miles, WSW 100 Miles, SW by W½W 9 Miles, and N 90 Miles. What

is the Difference of Latitude, Departure, Course, and Distance made good, and what Latitude and Longitude is the Ship in ?

First, on a piece of Paper, or slate, draw seven Columns; and title them, Course, Points, Distance, N, S, E, W. Then write down the several Courses; how many Points each course is from the Meridian; and the Distance sailed on each Course.

Find the Difference of Latitude, and departure to each Course and Distance; which write down in the Columns, under their respective Titles, viz. if the Course be between the N. and W. write the Difference of Latitude under N. and the Departure under W. &c.

Course.	Pts.	Dist.	N	S	E	W
NNW - -	2	40	37			15 $\frac{1}{2}$
SW $\frac{1}{2}$ W - -	4 $\frac{1}{2}$	75		47 $\frac{1}{2}$		58
ENE - -	6	35	13 $\frac{1}{2}$		32 $\frac{1}{2}$	
E - - -	8	40			40	
S - - -	0	25		25		
WSW - -	6	100		38		92 $\frac{1}{2}$
SW by W $\frac{1}{2}$ W	5 $\frac{1}{2}$	9		4		8
N - - -	0	90	90			
			140 $\frac{1}{2}$	114 $\frac{1}{2}$	72 $\frac{1}{2}$	173 $\frac{1}{2}$
			114 $\frac{1}{2}$			72 $\frac{1}{2}$
			36			101 $\frac{1}{2}$

The first Course is NNW; two Points, and the Distance 40 Miles, find by Example 3d. the Difference

Difference of Latitude, 37 Miles, and the Departure, $15\frac{1}{2}$ Miles, which write down under N. and W. respectively, because the Course is between the North and West.

The second Course is SW $\frac{1}{2}$ W, 4¹ Points, and the Distance 75 Miles; the Difference of Latitude and Departure found, by Example 3d. is $47\frac{1}{2}$ Miles, and 58 Miles, which must be written under S. and W. the Course being between those Points.

In the same manner proceed with the other Courses, observing that if any of them be N. S. E. or W. viz. or 0, and 8 Points, you have nothing more to do than to write the Distance under its respective Title, as in the 4th, 5th, and 8th Courses.

In the 3d Course, the Distance will be found too small to give the Difference of Latitude, therefore, double the Distance, viz. call it 70, and you will have double the Difference of Latitude, and Departure; half which write down in their respective Columns. The 7th Course is under the same Predicament, and must be quadrupled, that is, taken four times greater than it is, and you will have four times the Difference of Latitude, and Departure; a Quarter of which must be written down in the respective Columns.

Add the Numbers in each of the four last Columns together, and take the Difference between the Sums in the N. and S. Columns, for the Difference of Latitude made good; also the Difference between the Sums in the E. and W. Columns, for the Departure made good; which in this case is 36 Miles N, and $101\frac{1}{2}$ Miles W; therefore, the Course and

C ,

Distance

Distance made good lie between the N. and W. Points; and are thus found,

Lay the T. to the Difference of Latitude, then move the Index 'till it cuts the Departure $101\frac{1}{2}$ on the T; the Index will then cut the Course made good on the Rumb A. viz. in 75 Parts, $6\frac{1}{4}$ Points, or $WNW\frac{1}{4}W$. nearly; and the T. will cut the Index at 108 Miles, the Distance made good.

Having found the Course $WNW\frac{1}{4}W$; the Distance 108 Miles, the Difference of Latitude 36 Miles N, and the Departure $101\frac{1}{2}$ Miles W, they are said to be made good; or, the same the Ship would have made, had she sailed in a strait Line, instead of those different Courses.

Now find the Latitude in. The Ship being in N. Latitude, and having sailed to the Northward, the Latitude is increased.

Latitude sailed from,	-	40d.	10m.
Difference of Latitude	-	0	36
Latitude in	-	40	46N

To find the Difference of Longitude. Take the mean Latitude, Between the Latitude sailed from, and the Latitude in; it will be about $40\frac{1}{2}$ m.

Lay the Index to a little more than 40 , on the Lat. A; slide the T. to the Departure, $101\frac{1}{2}$, on the Lat. L; the Index will cut 132 Miles, or $ad. 12m.$ the Difference of Longitude on the T.

Longitude

Longitude failed from 4d. 12m. W.
Difference of Longitude 2 12

Longitude in - - 6 24 W.

Because the Ship is in West Longitude, and has failed westward.

EXAMPLE IX.

A Ship from Lat. 58d. 50m. S. Longitude 16d. 15m. E. fails SSW 54 Miles, W by S. 39 Miles, NW by N. 40, NE by E. 69, and NNW 60. What is her Course, Distance, Difference of Latitude and Departure made good, and Latitude and Longitude in?

Course.	P.	Dist.	N	S	E	W
SSW	2	54		50		21
WbS	7	39		7 $\frac{1}{2}$		38
NWbN	3	40	33			22
NEbE	5	69	38		57 $\frac{1}{2}$	
NNW	2	60	55 $\frac{1}{2}$			23
			126 $\frac{1}{2}$	57 $\frac{1}{2}$	57 $\frac{1}{2}$	104
			57 $\frac{1}{2}$			57 $\frac{1}{2}$
			69			46 $\frac{1}{2}$

Difference of Latitude made good, 69 Miles N, or 1d. 9m; Departure 46 $\frac{1}{2}$ Miles W; Course NW by W. nearly.

C 2

Latitude

Latitude failed from, 58d. 50m. S.

Difference of Latitude, 1 9

Latitude in - - 57 41 S.

Mean Latitude 58 nearly. Difference of Longitude 88 Miles, or 1d. 28m. W.

Longitude failed from, 16d. 15m. E.

Difference of Longitude, 1 28 W.

Longitude in - - - 14 47 E.

In this Case the Ship is in South Latitude, and has failed to the Northward, and in East Longitude, and has failed to the Westward; consequently has decreased, both Latitude and Longitude.

Of Variation and Lee-way.

The Variation of the Compass, is the Difference between the Line of Direction of the North and South Points of the Compass; and the Line of Direction, of the Shadow of a perpendicular Line, when the Sun is upon the Meridian, or exactly at Noon. The North Point of the Compass in some Parts of the World inclines to the Westward of the true Meridian; in some Parts it has no Inclination, and in some Parts it inclines to the Eastward. In London it inclines about 22 Degrees, or nearly 2 Points to the Westward, and this is called West Variation.

To allow for the Variation.

Supposing yourself so small as to stand in the Center of the Compass, or the Compass large enough

enough for you to do so; look along that Point of the Compass upon which the Ship has sailed, then if the Variation be West, allow it to the Left-hand; but if East, to the Right.

EXAMPLE X.

A Ship has steered NW, by the Compass, where the Variation is $1\frac{1}{2}$ Point W: What is the true Course?

From the Center look along the NW. Point, and reckon $1\frac{1}{2}$ Point to the Left-hand, the true Course will be NW by W.: W. $5\frac{1}{2}$ Points.

EXAMPLE, XI.

Suppose the Course steered by the Compass SE. and the Variation half a Point East; the true Course will be SE. by S. $\frac{1}{2}$ E, $3\frac{1}{2}$ Points. Observe in these Examples what is said of the Compass in Page 9.

Lee-way, is how much a Ship is driven by the Wind, from the Course she seems to steer, when she is close-hauled. The young Mariner, when on board will soon learn what Lee-way a Ship makes under different Sail, by observing the Difference between the Direction of the Ship's Wake, and the Direction of the Keel.

To allow for Lee-way.

Suppose the Figures 10, 20, 30, upon the West Point of the Compass, to be the length of a little Ship, steering W; and that the Wind blows hard from the NNW, towards the Center of the Compass, causing the Ship to make two Points Lee-way; then the Course will be WSW, by the Compass,

EXAMPLE

EXAMPLE XII.

Suppose a Ship steers WNW, the Wind blowing from the SW, and makes one Point Lee-way, what is her Course by the Compass?

The Ship is steering WNW, and the Wind blows from the SW, towards the Center of the Compass, and makes her deviate from the apparent Course to NW. by W. by the Compass.

These twelve Examples being understood, the Learner will find little Difficulty in keeping a Journal of a Voyage to any Part of the World, as he may, when on board a Ship, easily learn to determine the Latitude, by an Observation of the Sun's Meridian Altitude, and thence to correct his Reckoning.

The Variation of the Compass may be known in any Part of the World, by Mr. Dunn's new Variation Chart, if the Learner has not an Opportunity of being instructed how to determine it by an Azimuth or Amplitude.

There are several other little Notitia, which the young Mariner will easily acquire on board, by Observation; such, as the Method of determining the Ship's Way, by the Log, and Half-minute Glass; the marking the Log-board, &c. Therefore, I shall proceed to the Journal, which is an Account kept of the Voyage in such a Manner, as to give at any Time, the Place, or Latitude and Longitude the Ship is in.

The Specimen of a Journal here given, contains six Columns.

The

The first, marked H. for the Hours, at which the Particulars of the four following Column's are noticed.

The second and third, for the Rate of the Ship's Way, (marked K. and H. K.) the Knots and Half-knots, or Miles and Half-miles, the Ship runs per Hour.

The Fourth and Fifth, for the Course and Winds.

The sixth, for any thing that occurs, remarkable, during the twenty-four hours. N. B. The Day is supposed to begin at Noon; and A. M. signify, *ante meridiem*, or before Noon; P. M. *post meridiem*, or after Noon.

The Ship's Way, in this Specimen, is noted every two hours, consequently, the Knots and Half-knots, when added together, must be doubled, to give the Distance run upon each Course.

On board Indiamen and Men of War, the Ship's Way is noticed every Hour in Knots and Tenths; and there is another Column, for Lee-way in their Journals, which, as well as the Variation, is here noticed in the sixth Column.

At the bottom of each Day's Remarks there are ten little Spaces; the 1st, 2d, 3d, 4th, 5th, 6th, 7th, and 10th, are for the Particulars found (as per Titles) by Examples 8th, and 9th, in which the true Course is supposed to be given. The 8th Column contains the Meridian Distance, or the Sum or Difference of all the Departures, in Degrees and Minutes. The 9th contains, in the same Manner, the Difference of Longitude.

The first marked H. for the Hours, at which
the Participants of the following Columns are
agreed.

The second and third, for the Rate of the
Ship's Way, (marked K. and H. K.) the Knots
and Half-knots of Miles and Half-miles, the
Ship runs per Hour.

The fourth and fifth, for the Counts and
Winds.

It is fixed, for any thing that occurs, remain
able, during the twenty-four Hours, N. B. The
Clock is supposed to begin at Noon; and A. M.
beginning next morning, or before Noon; P. M.
beginning at after Noon.

The Ship's Way, in this document, is noted
every two Hours, consequently, the Knots and
Half-knots, when added together, must be
doubled, to give the Distance run upon each
Count.

On board Indiamen and Men of War, the
Ship's Way is noted every Hour in Knots and
Tenths; and there is another Column for the
Way in the Minutes, which as well as the
Rate, is noted in the fifth Column.

At the bottom of each Page, Remarks there is
ten little Squares, the first, and second, for the
Wind and Tides, the third, for the Direction of the
Tides, by Example, this, and others, in which the
true Count is supposed to be given. At the fifth
Column contains the Meridian Distance, or the
Sum or Difference of all the Distances, in De-
grees and Minutes. The sixth contains, in the
lower Margin, the Difference of Longitude.

A
JOURNAL
OF A
VOYAGE,

FROM THE
LIZARD, *towards* MADEIRA,

IN THE SWIFT,

A. B. Commander.

A. D. MDCCLXXXI.

An Explanation of which follows the Journal.

JOURNAL

OF

VOYAGE

FROM

NEW YORK

TO

THE

END

Ship SWIFT, from London towards Madeira.

				Monday, the 1 st . of January, 1781.	
H	K	Hk	Courfes.	Winds	
2					Moderate Gales and fair Weather.
4					At 6 P M the Lizard bore NNE,
6					whence I take my Departure, it
					being in
8	4		SW	NE	Lat. 49 : 55 N
					Lon. 4 : 45 W from Greenwich.
10	7				
12	8	1			
2	7	1			
4	6				
6	6	1			
8	8				
10	6				Variation $1\frac{1}{2}$ Point W.
12	4	1			

Courfe || Diff. || Latitude in || N || S || E || W || Mer. D. || Dif. of L. || Long. in
SSW $\frac{1}{4}$ W || 183 || 47 : 55 N || || 120 || || 57 || 0 : 57 W || 1 : 26 W || 6 : 11 W

				Tuesday, 2d Jan. 1781.	
2	8	1	SW	NNE	
4	9				Saw several Ships to the Northward.
6	9				Fine Gales and pleasant Weather.
8	7	1		NNW	
10	6			NW	
12	5		SSW		
2	6				
4	7				
6	7	1			
8	8	1	SSW $\frac{1}{2}$ W		
10	9				Variation $1\frac{1}{4}$ Point W.
12	9				

Courfe || Diff. || Lat. in || N || S || E || W || Mer. D. || D. of L. || Lon. in
S by W $\frac{3}{4}$ W || 180 || 45 : 6 N || || 169 || || 62 || 1 : 59 W || 2 : 55 W || 7 : 40 W

Ship S W I F T, from London towards Madeira.

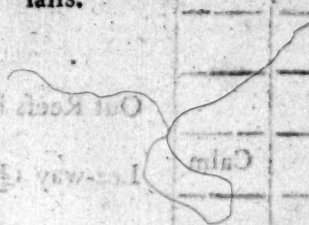
H	K	Hk	Courfes.	Winds	Wednesday, 3d of Jan. 1781.
2	8	1	WbyS	N	Fine Gales.
4	9				At 6 P. M. reefed the Topfails.
6	9				At 2 A. M. double reefed the Topfails.
8	9				At 8 A. M. saw a French Privateer
10	10				right a head, Distance 1 League;
12	9	1			and we steered from her as per Log.
2	8		W		
4	7	1			
6	7			NbW	
8	8		EbyN		
10	10			NW	Variation 1 Point W.
12	10	1			

Courfe.	D.	Latitude in.	N.	S.	E.	W.	Merid. D.	Diff. of L.	Long. in.
wsww	1w	98	44d. 36m. N		30		93	3d. 32m. w	5d 6m w 9d 51m. w

H	K	Hk	Courfes.	Winds	Thursday, 4th of Jan. 1781.
2	10		ENE	NW	Strong Gales and fair Weather.
4	10	1			At 2 A. M. close reefed the Topfails.
6	10				At 4 P. M. could just see the Privateer.
8	11				
10	10				
12	8			NNW	
2	8				
4	8	1			
6	8		WSW		
8	3				
10	8				Variation 1 Point W.
12	8				

Courfe.	D.	Latitude in.	N.	S.	E.	W.	Merid. D.	Diff. of L.	Long. in.
nabyz	88	45d. 24m. N	48		73		2d. 19m. w	3d. 23m. w	8d. 8m. w

Ship SWIFT, from London towards Madeira.

H	K	Hk	Courfes.	Winds	Friday, the 5th of January, 1781.								
2	10		SWbyS	NNW	Fresh Gales, with Squalls of Rain.								
4	10	1											
6	10				At 4 A. M. out two Reefs both Top-fails.								
8	10												
10	10												
12	9	1											
2	9				Calm								
4	8												
6	9	1			WN SW								
8	10												
10	10				Variation 1 Point W.								
12	10												
Course					Dist.	Latitude in	N	S	E	W	Mer. Dist.	Dist. of L.	Long. in
SSW					21 5	42 d. 6 m. N		198		82	30. 41 m. W	5 d. 17 m. W	10: 2 W
2	10		SWbyS	NW	Saturday, 6th Jan. 1781.								
4	10			WNW	Moderate Gales and Rain.								
6	9												
8	8	1		wbyN	Lee-way 1 Point on this Courfe.								
10	7												
12	6			W									
2	6		SSW										
4	5	1											
6	5												
8	5												
10	4	1											
12	5				Variation 1 Point W.								
Course					Dist.	Lat. in	N	S	E	W	Mer. Dist.	Dist. of L.	Long. in
SbyW 1/2 W					149	39: 42 N		143		39	4: 40 W	6: 9 W	10: 54 W

Ship S W I F T, from London towards Madeira,

H	K	Hk	Courses.	Winds	Sunday, 7th of Jan. 1781.
2	5	1	SSW	W	Fresh Gales.
4	5				
6	5				Close reefed both Topsails.
8	4				
10	2				Out Reefs both Topsails.
12	0			Calm	Lee-way $1\frac{1}{2}$ Point on the first Course.
2	0				
4	3		SW	NW	
6	4	1			
8	6				Pleasant Gales.
10	7	1			Variation $\frac{1}{2}$ Point W.
12	8				

Course D. Latitude in. N. S. E. W. Merid. D. Diff. of L. Long. in.
 SSW 96 38d. 15m. N 88 37 4d. 57m. w 6d 57mw 11d 42m. w

H	K	Hk	Courses.	Winds	Monday, 8th of Jan. 1781.
2	9	1	SW	N	
4	10				Pleasant Gales.
6	10				
8	10	1			
10	11				
12	11				
2	10				
4	10	1			
6	10				
8	10				
10	10				Variation $\frac{1}{2}$ Point W.
12	10				

Course. D. Lat. in. N. S. E. W. Mer. D. Diff. of L. Long. in.
 sw by s $\frac{1}{2}$ w 245 35d. 6m. N 189 155 4 : 57 w 10 : 11 w 14 : 56 w

Ship SWIFT, from London towards Madeira.

Tuesday, the 9th of January.

H	K	lk	Courses	Winds
2	10		swbys $\frac{1}{4}$ w	NNW
4	11			
6	11	1		
8	11	1		
10	12			
12	12			
2	12			
4	12			
6				
8				
10				
12				

Pleasant Gales.

Lay too.

At 7, saw the Island of Madeira,
bearing WSW dist. 12 Leagues.

Variation $\frac{1}{4}$ Point W.



OF THE

JOURNAL.

IN the first Day's Remarks, the Departure is taken from the Lizard Point. It bearing from the Ship NNE, 6 Leagues, or 18 Miles, by the Compass, is the same as if the Ship had sailed 18 Miles SSW. from it; which must be considered as the first Course. Then allowing the Variation $1\frac{1}{2}$ Point W, the true Course will be S. $\frac{1}{2}$ W. or $\frac{1}{2}$ a Point, which must be put down, with the Distance, 18 Miles, on a Slate, or Piece of Paper, as in Example 8th or 9th. The next Course from 6 P. M. to 12 next Noon, is SW; but allowing the Variation, the true Course is SSW. $\frac{1}{2}$ W. or $2\frac{1}{2}$ Points, which put down under the first Course; then add together the Knots, the Sum will be 56, and the 4 Half-knots make 58 Knots, or Miles, which doubled is 116 Miles, the Distance sailed on that Course. Find, as in Examples 8th and 9th. the Difference of Latitude,

E Departure

Departure, and Course and Distance made good ;
also, the Difference of Longitude, and Latitude
and Longitude in, which will be as follows.

Courfe.	P.	Dist.	N.	S.	E.	W.
$S\frac{1}{2}W$	$\frac{1}{2}$	18		18		2
$SSW\frac{1}{2}W$	$2\frac{1}{2}$	116		102		55
				120		57

Diff. of Lat. 120 Miles, or 2d. 6m. S.

Departure 57 Miles, or od. 57m. W.

Course $SSW\frac{1}{2}W$.

Distance 113 miles.

Latitude sailed from 49d. 55m. N. viz. the Lizard.

Diff. of Latitude 2 0

47 55 N.

Mean Latitude 48d. nearly

Diff. of Longitude 1 26m.

Long. sailed from 4 45 W.

Longitude in - - 6 11 W.

Meridional Distance od. 57m. W. the same as
the Departure.

All which, put down under their respective
Titles, in the ten Columns, at the bottom of the
Remarks; and this Day's Work, (as it is called,) is
finished.

In

In the second Day's Remarks, the first Course is SW, by the Compass, but allowing the Variation (as per Column the 6th.) $1\frac{1}{4}$ Point W. the true Course will be SSW. $\frac{3}{4}$ W. or $2\frac{3}{4}$ Points. The Knots and Half-knots, for that Course, viz. from 2 hours to 10 P. M. inclusive, being added together, and doubled, will give 80 Miles for the Distance. The second Course, the Variation being allowed, will be S. $\frac{3}{4}$ W. or $\frac{3}{4}$ of a Point, and the Distance sailed upon that Course 51 Miles. The third Course will be S. by W. $\frac{1}{4}$ W. or $1\frac{1}{4}$ Point; and the Distance 53 Miles; whence, will be found by Example 8th.

The Diff. of Lat. 169 Miles, or 2d. 49m.

Departure 62 ¹ ²

Course S. by W. $\frac{3}{4}$ W.

Distance 180.

Then taking the Latitude and Longitude Yesterday, for the Latitude and Longitude sailed from, which is always to be done.

Latitude Yesterday, 47d. 55m. N.

Diff. of Lat. - - 2 49

Lat. in - - - 45 6 N.

Mean Lat. - - 46 $\frac{1}{2}$

Diff. of Longitude 89 Miles, or 1d. 29m.

Longitude Yesterday, - - - 6 11

Longitude in - - - 7 40 W.

E 2

Mer.

Mer. Dist. Yesterday,	-	-	-	0	57	W.
Departure to Day	-	:	-	1	2	W.
Meridional Dist.	-	-	-	1	59	W.
Diff. of Lon. Yesterday,	-	-	-	1	26	W.
to Day	-	-	-	1	29	W.
Diff of Longitude	.	-	-	2	55	W.

Which are to be put down under their respective Titles, to finish this Day's Work.

The third Day's Remarks contain nothing but what will be easily understood, by the 8th Example, and the two preceding Day's Works.

The fourth Day; The Diff. of Lat. and Departure made good, being N. and E. respectively; the Lat. in, will be more; and the Mer. Dist. Diff. of Lon. and Lon. in, will be less than Yesterday's, by Example 9th.

Now suppose it were required, this Day, to find the Course and Distance to the Island of Madeira, the Question may be answered by example the 6th. taking the Lat. and Lon. the Ship is in to Day, viz. 45d. 24m. N. and 8d. 8m. W, instead of the Lat. and Lon. given in that Example,

Lat. in - -	45d. 24m. N.	Lon. 8d. 3m. W.
Madeira -	32 23	17 31
	13 1	9 23
	60	60
Difference	781 Miles	563 Miles

Mean Latitude 39d.

Departure 430 Miles,

Course to Madeira 31 Parts, or $2\frac{1}{2}$ Points nearly; or SSW. $\frac{1}{2}$ W. Distance 895 Miles.

The fifth Day contains but one Course, therefore the Variation being allowed, it is SSW. Distance the same as the Knots doubled, and the rest as found by Example 7th.

The sixth Day, the Lee-way one Point must be allowed on the last Course, (by Example 11th,) which makes the Course S. by W. by the Compass, then allowing the Variation the true Course is South.

The following Days contain nothing that the Learner has not, in the preceeding, been made acquainted with; nor is there any thing remarkable in them, except the Swiftnefs of the Swift towards her intended Port. Currents, heavy Swells, &c. setting the Ship out of her intended Course, might have been noticed in the Journal; but as the Intent of this little Treatise is to shew the Use of the Instrument, and to initiate the young Mariner into the Method of keeping a Reckoning at Sea; to the experienced Navigator

gator it was needless to remark them; and the Maritime Novitiate, to whom I wish Success, will soon know them by Experience.

A T A B L E

For reducing the Parts of the Instrument into Degrees, Minutes, and Seconds.

Parts.	Deg.	M.	Sec.	Parts.	Deg.	M.	Sec.
1—0	56	15		20—18	45	0	
2—1	52	30		30—28	7	30	
3—2	48	45		40—37	30	0	
4—3	45	0		50—46	52	30	
5—4	41	15		60—56	15	0	
6—5	37	30		70—65	37	30	
7—6	33	45		80—75	0	0	
8—7	30	0		90—84	22	30	
9—8	26	15		96—90	0	0	
10—9	22	30		1—0	28	7½	

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